AMERICAN ANNALS OF THE DEAF

FOUNDED 1847

Official Organ

Conference of Executives of American Schools for the Deaf

FOUNDED 1868

Convention of American Instructors of the Deaf

FOUNDED 1850

POWRIE VAUX DOCTOR, Ph.D.
Editor

Under the Direction of the Executive Committee of the Conference

MARSHALL S. HESTER	New Mexico, 1960
Chairman	
ROY M STELLE	Colorado, 1958
BEN E. HOFFMEYER	North Carolina, 1958
ARCHIE F. LEARD	Saskatchewan, Canada, 1959
CARL F. SMITH	North Dakota, 1959
WILLIAM J. MCCLURE	Indiana, 1960
HUGO F. SCHUNHOFF	West Virginia, 1960
STANLEY D. ROTH	Kansas, 1960
EDMUND B. BOATNER	Connecticut, 1960
THOMAS K. KLINE	Illinois, 1960

MAY, 1958

Volume 103 **Number 3**

THE CONFERENCE OF EXECUTIVES OF AMERICAN SCHOOLS FOR THE DEAF

President ..... [illegible], New Mexico
Vice President ..... [illegible] McCLURE, Indiana
Secretary ..... [illegible], West Virginia
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THE CONFERENCE OF EXECUTIVES OF AMERICAN SCHOOLS FOR THE DEAF originally the Conference of Superintendents and Principals of American Schools for the Deaf, was founded in 1868 and subsequently incorporated under the laws of the State of Maryland in 1931. The Conference is an organization of the executive heads of schools for the deaf in the United States and Canada, and has for its object "to promote the management and operation of schools for the deaf along the broadest and most effective lines and to further and promote the general welfare of the deaf."

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THE CONVENTION OF AMERICAN INSTRUCTORS OF THE DEAF, founded in 1850 and incorporated by act of Congress in [illegible], is an organization of educators of the deaf in the United States and [illegible] with the general object of "promotion of the education of the deaf along the broadest, most advanced, and practical lines," and for that purpose "to secure the harmonious union in the organization of all persons professionally engaged in educating the deaf in America."

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The American Annals of the Deaf

The AMERICAN ANNALS OF THE DEAF was founded in 1847 at the American School for the Deaf in Hartford, Connecticut, by the members of the faculty of that school, which is the first free public school for the deaf in America. Although the journal received the approval of the administrative school authorities, the periodical was first entirely sponsored by the members of the faculty. After two years the ANNALS was discontinued for some months but was revived by the members of the Convention of American Instructors of the Deaf in their first meeting in New York, N. Y., in 1850.

In June, 1861, the publication ceased because of the War Between the States, inasmuch as the membership of the Convention was made up of northerners and southerners in almost equal proportion. In September, 1868, the AMERICAN ANNALS OF THE DEAF resumed publication with the editorial offices on Kendall Green, in Washington D. C., where it has since remained.

The AMERICAN ANNALS OF THE DEAF is the official organ of the Conference of Executives of American Schools for the Deaf, which was organized in 1868, and of the Convention of American Instructors of the Deaf, founded in 1850. According to the Library of Congress it is the oldest educational publication in the United States still in existence. It is also the oldest journal on the education of the deaf in the world.

The ANNALS is published five times a year, being issued in September, November, January, March, and May. The subscription price is $4.00 a year, payable in advance. If five or more copies of the ANNALS are sent to one address, the subscription price is $3.50 a year. Single numbers sell for seventy-five cents, except for the January number which sells for $2.00. Back issues are available for 1847, 1848, 1849, 1857, and from September, 1868, to the present. Indexes for 1847–1875, 1876–1885, 1886–1895, 1896–1905, are available at $2.00 each. Indexes for 1906–1915, 1916–1925, 1926–1935, 1936–1945, 1946–1955, were issued as regular numbers of the ANNALS and may be purchased for $2.00 each. All back issues prior to 1940 sell for $1.00 each. All requests for subscriptions or for back numbers should be addressed to Editor, AMERICAN ANNALS OF THE DEAF, Gallaudet College, Washington 2, D. C.

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AMERICAN ANNALS OF THE DEAF

Vol. 103 May, 1958 No. 3

Announcements

OFFICIAL CALL FOR THE THIRTIETH REGULAR MEETING OF THE CONFERENCE OF EXECUTIVES OF AMERICAN SCHOOLS FOR THE DEAF

The thirtieth regular meeting of the Conference of Executives of American Schools for the Deaf will be held at the Clarke School for the Deaf, Northampton, Mass., on October 5 to 10, 1958, for the purpose of conducting the necessary business, including reports of the officers and chairmen of standing committees, and the election of executive committee members, and such other business as may properly come before the meeting.

Marshall S. Hester, President
Hugo F. Schunhoff, Secretary

The Alexander Graham Bell Association for the Deaf will meet at the Hotel Webster Hall in Pittsburgh, Pa., June 22–27, 1958.

The International Congress on the Educational Treatment of Deafness will meet at The University of Manchester, Manchester, England, July 15–24, 1958.

International Congress on the Educational Treatment of Deafness

University of Manchester, Manchester, England
July 15–24, 1958

Mr. Marshall S. Hester, president of the Conference, and Mr. William J. McClure, vice-president will be the official delegates to the Congress from the Conference of Executives of American Schools for the Deaf.

Mr. Hester who is a graduate of the Gallaudet College Department of Education, class of 1927, has been superintendent of the New Mexico School for the Deaf for a number of years. He was formerly principal at the California School for the Deaf in Berkeley.

Mr. McClure was graduated from Gallaudet College, Department of Education, in 1937. After serving for some years on the faculty of Gallaudet College, and as principal of The Kendall School, he accepted the superintendency of the Tennessee School for the Deaf. Mr. McClure is now superintendent of the Indiana School for the Deaf and editor of the *Proceedings* of the Convention of American Instructors of the Deaf.

One administrator and two teachers have been selected to represent the Convention of American Instructors of the Deaf at the International Congress on the Educational Treatment of Deafness.

Dr. Edward Abernathy, the chosen administrator, has been superintendent of the Ohio School for the Deaf since 1930. His Doctor of Philosophy degree was earned at the Ohio State University. He has served the Convention of American Instructors of the Deaf as first vice-president, 1955–57, and as president, 1957–59. Dr. Abernathy is a member of the Conference of Executives of American Schools for the Deaf and of the Ohio Education Association.

Miss Alyce Thomas and Mr. W. T. Griffing will accompany Dr. Abernathy to the Congress. Miss Thomas will represent the hearing teachers of America, and Mr. Griffing the deaf teachers. Both were agreed upon unanimously by the Executive Committee of the Convention after a careful screening of the many well qualified nominees submitted by the schools for the deaf.

Miss Thomas, a native of Illinois, is now a supervising teacher in the California School for the Deaf in Riverside. She earned her Bachelor of Education degree at Western University, Macomb, Illinois, and did graduate work at the University of Pittsburgh and at the Western Reserve University. Her teaching experience covers sixteen years in the various academic departments of the Illinois School for the Deaf, and four years as supervising teacher in the Arkansas School for the Deaf. She has been a supervising teacher in the California School for the Deaf for five years. Miss Thomas'

Convention activities as demonstrating teacher of language, geography, speech and reading, and as section leader in the division of speech, have brought her into prominence as a teacher of the deaf.

Mr. Griffing who was born in Oklahoma has been totally deaf since early childhood. He was graduated from the Oklahoma School for the Deaf in 1919, and from Gallaudet College in Washington, D. C. in 1924. His teaching career has been spent in the academic department of the Oklahoma School for the Deaf. Mr. Griffing has attained prominence among teachers of the deaf in the United States. As editor of *The Deaf Oklahoman* and as a regular contributor to *The Silent Worker,* his benevolent influence is felt throughout the deaf population of the country. He is a member of the Oklahoma Association of the Deaf, the National Association of the Deaf, and the Oklahoma Education Association.

The choice of these representatives at the International Congress on the Educational Treatment of Deafness is a happy one, and a signal honor from the largest and oldest organization of teachers of the deaf in the world. The Convention of American Instructors of the Deaf has a membership of over 2,000 drawn from schools throughout the United States and Canada.

The Thirtieth Regular Meeting of The Conference of Executives of American Schools for the Deaf

Clarke School for the Deaf, Northampton, Mass. October 5–10, 1958

BEN E. HOFFMEYER, M.A.
Superintendent, The North Carolina School for the Deaf, Chairman, Program Committee

Sunday, October 5

2:00–5:00 p.m. Registration and Information, Hubbard Hall, Clarke School

8:00 p.m. Convocation, Sun Room, Hotel Northampton

Presiding, Marshall S. Hester, President, Conference of Executives of American Schools for the Deaf, Supt., New Mexico School for the Deaf

Addresses of Welcome:

Dr. George T. Pratt, Supt., Clarke School for the Deaf

Dr. Archibald V. Galbraith, President, Board of Trustees, Clarke School

Dr. Phillip G. Cashman, Director, Division of Special Education, Department of Education, Massachusetts

Mayor James Cahillane, Mayor of Northampton

Responses to Addresses of Welcome:

East—Dr. Edmund B. Boatner, Supt. American School for the Deaf, Hartford, Conn.

Midwest—Mr. Howard M. Quigley, Supt. Minnesota School for the Deaf

West—Dr. Elwood A. Stevenson, Supt. California School for the Deaf, Berkeley, Calif.

South—Dr. Robert S. Brown, Supt. Mississippi School for the Deaf, Jackson, Miss.

Report of the President of the Conference of Executives of American Schools for the Deaf, Mr. Marshall S. Hester

Address: Dr. Clarence V. Hudgins, Director of Research, Clarke School, "Resume of a Year's Experience in England, including the International Congress held at the University of Manchester in July, 1958."

Monday, October 6	
8:00 a.m.–12 Noon	Registration, Hubbard Hall, Clarke School
	Opening Session, Chapel, Hubbard Hall
	Introduction of Board Members, Dr. Archibald V. Galbraith
	Address: "Looking Forward", Mrs. Russell William Magna, Member of the Board–General Chairman of Centennial Development Program, Clarke School
10:00–11 a.m.	Research, Dr. Richard G. Brill, Moderator, Supt., California School for the Deaf, Riverside, Calif.
	Dr. Romaine P. Mackie, Chief, Exceptional Children and Youth, Office of Education, Department of Health, Education and Welfare
	Mr. D. H. Dabelstein, Assistant Director for Program Planning and Evaluation, United States Department of Health, Education and Welfare
	Dr. Richard L. Masland, Assistant to the Director, National Institute of Neurological Diseases and Blindness
11:00–12:00 Noon	Discussion Period
12:00–1:30 p.m.	Lunch, Rahar's Inn, Northampton
2:00–3:00 p.m.	Research, Hubbard Hall
	Dr. Richard G. Brill, Moderator
	Dr. Raymond Carhart, Professor of Audiology, Northwestern University
	Dr. William G. Hardy, Director of Hearing and Speech Center, Johns Hopkins University
	Dr. Ira J. Hirsh, Research Central Institute
	Dr. Clarence V. Hudgins, Director of Research, Clarke School for the Deaf
	Mr. Roy M. Stelle, Recorder, Supt., Colorado School for the Deaf
3:00–4:00 p.m.	Discussion Period
6:00 p.m.	Reception, Dr. and Mrs. Pratt, Parsons House
7:30 p.m.	New England Clam Bake, Gilmore Gymnasium, Clarke School
8:30 p.m.	Committee Meetings
Tuesday, October 7	
8:30–9:30 a.m.	Observation Hour, Lower School (All Classes)
9:45–11:00 a.m.	Panel on Curriculum, Chapel, Chelmsford Room, Hubbard Hall
	Miss Harriet F. McLaughlin, Moderator, Prin. P.S. 47, New York
	Miss Barbara Griffin, Superv. Tch. Rochester School for the Deaf

	Mr. Joseph C. Giangreco, Asst. Supt., Iowa School for the Deaf
	Mr. Myron Leenhouts, Prin., California School for the Deaf, Berkeley, Calif.
	Mr. Edward L. Scouten, Chairman, Preparatory Department, Gallaudet College
	Dr. William J. McClure, Recorder, Supt., Indiana School for the Deaf
11:00–12:00	Discussion Period
12:00–1:00 p.m.	Lunch, Wiggins Tavern
2:00–5:00 p.m.	Choice of Campus Tour, or Trip to Mt. Holyoke, Mt. Sugar Loaf, Old Deerfield, Deerfield Academy
7:00 p.m.	Dinner at Magna House (Guests of Clarke School)
	Address: Dr. Benjamin F. Wright President of Smith College
Wednesday, October 8	
8:30–9:30 a.m.	Observation Hour, Middle and Upper Schools (All Classes)
9:45–11:00 a.m.	Panel on Teacher Training, Gilmore Gymnasium
	Mr. Howard M. Quigley, Moderator, Supt., Minnesota School for the Deaf
	Dr. S. Richard Silverman, Director, Central Institute for the Deaf
	Dr. George T. Pratt, Supt., Clarke School for the Deaf
	Dr. Leonard M. Elstad, President, Gallaudet College
	Dr. Clarence D. O'Connor, Supt., Lexington Avenue School for the Deaf
	Dr. Powrie V. Doctor, Editor, *American Annals of the Deaf*
	Dr. Hugo Schunhoff, Recorder, Supt., West Virginia School for the Deaf
11:00–12:00	Discussion Period
12:00–1:30 p.m.	Lunch, Northampton Country Club
2:00–4:00 p.m.	Business Meeting
7:00 p.m.	Banquet, Coach Light Room, Hotel Northampton
	Welcoming Address: The Honorable Leverett Saltonstall, United States Senator
	Address: Dr. J. Paul Mather, President of the University of Massachusetts
Thursday, October 9	
8:30–9:30 a.m.	Committee Meetings
9:45–11:30 a.m.	Panel, Responsibility of Schools for the Deaf —Atypical Deaf Children
	Dr. Genevieve M. Ryan, Moderator, Supt.,

	St. Joseph's School for the Deaf, New York, N. Y.
	Gilmore Gymnasium
	Dr. Clarence D. O'Connor, Supt., Lexington Avenue School for the Deaf
	Dr. Daniel T. Cloud, Supt., New York School for the Deaf
	Dr. Louis M. DiCarlo, Director, Speech and Hearing Center, Syracuse University
	Dr. Joseph Lord, Chief Psychologist, Childrens Medical Center, Boston
	Dr. Anna Mae Worthington, State Dept. of Education, Columbus, Ohio
	Dr. Leo Connor, Recorder, Lexington Avenue School for the Deaf
11:00–12:00	Discussion Period
12:00–2:00 p.m.	Lunch, Lord Jeffrey Inn, Amherst
2:00–4:00 p.m.	Panel—Administrative Problems in Residential Schools for the Deaf
	Chapel, Hubbard Hall
	Dr. Edmund B. Boatner, Moderator, Supt., American School for the Deaf
	Mr. Stanley D. Roth, Supt., Kansas School for the Deaf
	Mr. Archie F. Leard, Supt., Saskatchewan School for the Deaf
	Mr. Arthur Myklebust, Supt., South Dakota School for the Deaf
	Dr. Sam Craig, Supt., Western Pennsylvania School for the Deaf
	Sister Mary Angelita, C.S.J. Superior, Recorder, Boston School for the Deaf, Randolph, Mass.
2:00–4:00 p.m.	Panel, Administrative Problems in Day Schools for the Deaf, Hubbard Hall
	Miss Frances Phillips, Moderator, Acting Prin., Newark Day School
	Miss Harriet McLaughlin, Prin., P.S. 47 New York
	Mrs. Walter Stuck, Administrator, Sunshine Cottage, San Antonio, Texas
	Mr. Keith A. Gainey, Alexander Graham Bell School, Cleveland, Ohio
	Mrs. Serena Foley Davis, Willis and Elizabeth Martin Day School, Philadelphia, Pa.
	Mr. Nathan Harris, Recorder, Prin., Horace Mann School for the Deaf, Boston
	Discussion Period
4:00–5:00 p.m.	Committee Meetings

7:30 p.m.	Dinner at Gawith Hall and Roger Hall (Guests of Clarke School)
	Address: "The New Gallaudet", Dr. Leonard M. Elstad, President, Gallaudet College
	General Meeting, Gilmore Gymnasium
Friday, October 10	
9:30–11:00 a.m.	Business Meeting, Gilmore Gymnasium
	Report, *The American Annals of The Deaf*, Dr. Powrie V. Doctor, Editor
11:00–12:00	General Meeting

* * * *

Basic Considerations in Auditory Training*

D. Robert Frisina, Ph.D.
Director, Hearing and Speech Center, Gallaudet College, Washington 2, D. C.

Auditory training in schools represented by those of you present today involves, for the most part, youngsters who have not developed language in a spontaneous manner. That is to say, these children require special educational techniques designed to assist them in the acquisition of speech and language. One aspect, or phase, of these special methods, is of course, the use of amplification systems. Thus, the two most basic components in auditory training, insofar as we are concerned, are (1) the individual who has sustained some damage to his auditory mechanism and (2) the utilization of some form of amplification. It seems appropriate then, as a prelude to the speakers who follow, to concern ourselves with these two major factors. The first part of this paper, therefore, deals with basic considerations relative to the hearing impaired individual. The second part includes a brief discussion of the instrumentation sometimes used in the teaching of such children.

Basic to therapy for the hearing impaired individual is the status of his auditory residuum. In other words, in order to devise a sound approach to a child's problem, it is necessary to know how his hearing mechanism deviates from the system which is intact. Understanding this deviation presupposes some knowledge of the auditory system as well as the means by which one's auditory mechanism is assessed. For these reasons, a brief discussion of the auditory mechanism and the measurement of hearing seems in order.

Most of us are aware that outer and middle ear difficulties result in the conductive type of hearing impairment. On the other hand, lesions in the inner ear and points beyond result in the perceptive or nerve-type loss of hearing. It is well known that conductive losses do not exceed approximately 60db. Moreover, most outer and middle ear problems are medically reversible, the implication being that the type of youngsters you are to find in your classrooms are most likely those with lesions beyond the middle ear.

Much knowledge concerning the manner in which the outer and middle ears function is available. Briefly stated, the outer ear, including the pinna and the external auditory meatus serve as sound collecting devices which focus the air vibrations on the eardrum, or tympanic membrane. The three tiny bones, or ossicles, of the middle ear are linked to the outer ear by the junction of the first ossicle, the malleus, to the tympanic membrane and at the same time linked to the inner ear by the attachment of the footplate of the third ossicle, the stapes. In essence, the middle ear functions as an impedance matching device; a veritable "go-between" for the outside relatively less dense air medium and the comparatively

* A paper delivered at the meeting of the Convention of American Instructors of the Deaf, Knoxville, Tenn., June, 1957.

greater density of the inner ear fluids. That is, the air vibrations reaching the eardrum are transformed into mechanical energy (traveling through the ossicular chain; malleus, incus and stapes). The inner ear contains fluid matter in which are located the nerve endings of hearing. In order for these hair cells in the Organ of Corti to be stimulated there must be a movement of the fluid. The mechanical force from the ossicular chain is applied to the fluid of the inner ear by way of the stapes which is attached to the inner ear at the oval window. Thus the mechanical energy of the middle ear is transferred to the inner ear. The middle ear, then, with its dynamically balanced ossicular chain, effectively and efficiently, with a minimum loss of energy, allows air vibrations to effect changes in the liquid medium of the inner ear.

A great deal is known about the anatomy of the Cochlea and the nerve tracts of the auditory system beyond the Organ of Corti. Much less is known about how these sections of the auditory mechanism actually operate. Recent advances have been made in the understanding of how the Organ of Corti functions in the transduction of hydraulic energy to electrical energy, but a good deal of information relative to the neurophysiology from this point on is not clear. Insofar as the pathways from the Cochlea are concerned, it is known that a nerve impulse initiated at the hair cells in the Organ of Corti, after traveling through the VIIIth nerve proper, can pass through several synaptic junctions on the same side and/or opposite sides of the brain stem on its way to the auditory cortex. These synapses, or junctions between nerve fibres, occur at different levels of the central nervous system and thereby provide opportunities for the transfer of nerve impulses from one side to the other, thus introducing the complex binaural aspects of hearing. Moreover, the complexity of the system becomes more obvious and presumably makes possible a greater diversity of auditory problems.

In summary, the Organ of Corti, located in the Cochlea of the inner ear, is a peripheral nervous system sense organ, of which the chief function appears to be one of encoding information into electrical energy. This energy is transmitted through the VIIIth nerve trunks, to and through the lower central nervous system levels, eventually reaching, via direct or circuitous routes, the auditory cortex wherein the information is decoded.

The hypothesis that all cases of hearing impairment, commonly referred to as nerve-type or perceptive, are confined to the inner ear would be quite untenable. In many instances detailed medical and developmental histories, as well as psychological and neurological data, can be strongly suggestive of central nervous system damage. In other cases, functioning on certain psychological tests suggest this possibility even when there is no clear-cut history or positive neurological indications of central organic factors being present. Some of these youngsters are mentally retarded, some might be aphasic, while others react similarly to those children presumed to have problems in the Organ of Corti.

In certain cases of hearing impairment occurring in adulthood, it

has been possible to distinguish some end organ from retrolabyrinthine (i.e. central to the inner ear) problems with a reasonable degree of accuracy. However, the methods for making this distinction have not as yet been sufficiently definitive. This state of affairs is also true in the case of children. The means for specifying site of lesion in children require further experimentation and definition, but GSR and EEG audiometry, as well as some psychological tests, have been highly provocative in this respect. Suffice it to say at this point that some of the losses in hearing are apt to be caused by damage or maldevelopment of the auditory system at junctions beyond the Cochlea.

There are two important concepts related to the general field of psychological testing that also are pertinent to the testing of hearing. These are reliability and validity. Reliability in the testing of hearing refers to repeated responses to equivalent or similar stimuli. Validity refers to the degree to which the individual's responses to sound reveal his true auditory capacity or true status of his auditory mechanism.

Responses take many forms depending upon the type of test and the age of the child. It is significant that presumed peripheral nervous system problems (end organ) respond reliably when a given level of loudness is reached. In practice, this level is generally accepted as the person's threshold (50% or more correct responses). However, certain individuals respond reliably but not validly. For example, malingerers often respond to levels of various sounds which to them seem equally loud. That is, they do not respond at threshold but delay responses until the sound reaches a certain level of loudness. Then they attempt to match subsequent stimuli to the reference level of loudness set according to the initial stimulus. Thus, the feigned results in any given session could be reliable but not necessarily valid. Tested at intervals and with different stimuli it is possible to lower test-retest reliability in many such cases because the loudness reference level is difficult to maintain from day to day.

In testing mentally retarded youngsters it is sometimes necessary to raise the intensity of the pure tones a significant degree above normal threshold whereas with speech audiometry it is possible to demonstrate essentially normal hearing. The reverse of this situation is also sometimes true. This suggests that individuals with central nervous system involvements might have difficulties other than auditory acuity. Apparently, additional loudness levels are necessary before reliable responses are made to pure tones. These factors suggest the importance of mental age and the organismic integrity of an individual when attempting to evaluate hearing thresholds or potentialities in the area of auditory training.

With this as background, let us next consider the concept of "hearing threshold" as it might relate to auditory training. When an individual's hearing is tested for threshold sensitivity, by a conditioning technique or standard audiometric methods, what are some of the underlying assumptions or basic considerations due such a situation? First of all, we must realize that normal hearing

or the 0db reading on the hearing loss dial of an audiometer is a statistical concept rather than an absolute entity. That is to say, a group of young adults, with presumably normal hearing, often serve as the basis for normal hearing as reflected on the audiometer. In addition, the 0db level of hearing loss represents an average derived from a series of tests in which each person contributing to this average responded correctly, in one way or another, 50 percent of the time. It is essential to emphasize that normal hearing, let alone the threshold of hearing in pathological cases, is not a static or absolute ability. Rather, it is relative and subject to variation on the bases of the manner in which it is measured, the physical characteristics of the signal and the acoustic conditions of the environment in which hearing is being evaluated. For example, one can derive different thresholds by using continuous tones as opposed to interrupted tones[1] a descending threshold differs slightly from a threshold determined by raising the intensity of the tone from inaudibility to fifty percent correct responses[2], and thresholds are found to vary in accordance with different levels of background noise[3]. It is important to realize that response to most tests of hearing and to auditory training in general is a subjective phenomenon, a stimulus-response situation. Relatively little is known about what actually occurs between the stimulus and the response. That is, the individual indicates when he hears and interprets in his own way what he hears. At present there is no direct measure of what he hears. It becomes clear, then, that the integrity of an organism, psychologically and organically, introduces sources of variation in the meaning of the terms "normal" and "impaired hearing."

One is forced to wonder about the concept of threshold in many youngsters with auditory disorders. It is common knowledge that many brain damaged children demonstrate inconsistencies in behavior. It is also common knowledge that many such children are found among school for the deaf populations. It is apparent that many schools are being requested to take more of such children. The fact remains that many children in schools for the deaf have multiple involvements. Therefore, the assumption that all children in schools for the deaf have similar anatomical and physiological residuals in the auditory mechanism and thus need the same therapeutic approach in auditory training is open to question. Any good teacher is well aware of this. The point being raised at this time relates to the implied individual differences. That is, can individual variations, or more specifically, might success or failure in auditory training be related to the site of the lesion? Since the auditory problem is only one aspect of the multiple involvements of many of these children, higher central nervous system lesions might be expected to restrict the relative contribution auditory training can make to language development in such cases.

[1] Hirsh, I. J., *The Measurement of Hearing*. New York: McGraw-Hill Co., Inc., 1952. p. 104.
[2] *ibid.*, p. 103.
[3] *ibid.*, p. 170.

Before dispensing with this concept of the varying hearing threshold, let us return to the children with end organ hearing losses. As you know, such cases found in schools for the deaf usually have better hearing for lower than for the higher frequencies. This introduces the problem generally referred to as frequency distortion. Simply stated, the inner ear is able to encode only a portion of the frequencies presented to it. Thus there is no one-to-one relationship acoustically between what is uttered by a speaker and that which is received by the listener. The implication is that since the higher frequencies are so important for comprehension of spoken language, those with high frequency losses do not have a steady or static threshold of hearing. This is partially due to acoustic aspects of speech and also due to differences in speaker characteristics which in effect produce instability of hearing. Also, these youngsters are "in and out" hearing-wise on the basis of the language being used. This is particularly likely in those who are learning language and at the same time learning to use imperfect auditory systems. However, the human ear possesses an extraordinary abillity to resolve minute differences as well as complex combinations of frequencies and intensities. It has an incredible amount of reserve for resolving power differences. Coupled with the tremendous capabilities of the normal human mind auditory discriminations and potentialities become infinite. Therefore, the end-organ hearing-impaired child with average mental ability is likely to respond well to amplification providing training is carried on systematically and continuously. He is expected to make use of minute auditory clues but use them well by integrating a myriad of non-auditory clues available in most interpersonal relationships. The rationale for the use of amplification systems and the goals set for any given individual are expected to vary with the general stability and degree of hearing impairment for speech as well as the status of the central nervous system.

Let us next consider briefly some basic principles utilized in amplification systems. There are three basic components in any amplification system; a microphone, amplifier and receiver (speaker). The microphone picks up air vibrations and converts them to electrical energy which is passed on to the transistors or vacuum tubes which serve to amplify or make the electrical disturbance stronger. The amplifier then feeds into the receiver, headset or speaker which in turn converts the electrical energy back into air vibrations. The receiver is essentially a microphone in reverse. The basic purpose of a wearable hearing aid and a group amplification unit is to make sounds louder; *any sounds* that reach the microphone. The amplification unit is not selective in terms of what it will amplify. It is limited in terms of how it might accept or reject frequencies and intensities. If it does not respond in a linear fashion with respect to frequency and intensity, distortion is introduced. Each of you have noticed quality differences between a table radio and a "hi-fi" model. In general, the reduction in the size of the instrument and alterations in frequency response of the components introduce changes in the quality of reproduction. In

addition to these considerations one finds, with few exceptions, that the amplification units used in schools for the deaf are monaural systems. That is, they consist of one microphone and one amplifier and generally feed a signal to the two receivers. Most present wearable hearing aids likewise are monaural units.

Any one-microphone system is essentially a one-ear unit. All outside sounds reaching the instrument, both foreground and background, come through the common microphone. Even when two headsets are used in such cases speech is fed through the same microphone as is noise. Although much definitive information is lacking in this area, there are suggestions that, in special instances, monaural listening is not as effective as binaural (systems employing independent microphone, amplifier and receiver circuits to each of the ears) hearing. Several studies relate directly to this problem. Briefly stated, it has been consistently demonstrated that the binaural threshold for hearing is 3db more acute than for the monaural threshold. This is true for pure tones as well as speech.

When the relative efficiency of monaural and binaural hearing was assessed in the presence of a noise background divergent results were obtained. Hirsh[4] found that the difference between monaural and binaural masked thresholds for pure tones and speech reversed themselves as the intensity of the masking noise was increased. That is to say, in quiet there was a binaural advantage for speech and pure tones. However, this advantage was reduced to zero for speech at about 50db SPL of noise and thereafter speech intelligibility became worse for the binaural condition than for the monaural. This decrease in binaural efficiency was termed binaural inhibition.

At the same time, Licklider[5] completed a similar study which clarified to a large extent this seeming paradox. Moreover, Licklider was able to elaborate further on the matter of phase relations. When discussing binaural stimulation, an understanding of phase is fundamental. Briefly stated, sounds reaching the two ears can be said to be "in phase" or "out of phase." When sounds are "in phase" it simply means that the eardrums are moving in and out together. "Out of phase" means that one eardrum is making its inward excursion while the opposite ear is moving outward. When this inversion takes place the drums are moving in opposite directions or in a direction of 180 degrees with reference to the center of the head. When earphones are connected, they are routincly connected in such a way that when sound is coming to the earphones from a common source, the diaphragms of the earphones are "in phase."

Since these experiments were done with earphones, phase, intracranial localization and masking are seen to be related. These

[4] Hirsh, I. J., "The Influence of Interaural Phase on Interaural Summation and Inhibition." *Journal Acoustic Society of America*, 20, 536–44.

[5] Licklider, J. C. R., "The Influence of Interaural Phase Relations Upon the Masking of Speech by White Noise." *Journal Acoustic Society of America*, 20, 150–59.

considerations are pertinent to wearable hearing aids and to auditory training units utilizing a single microphone and amplifier; irrespective of the number of earphones or receivers.

In addition to this phase relation of the signal, it is possible to arrange the instrumentation in such a manner that speech delivered to the two ears can be "in phase" (0 degrees) or "out of phase" (180 degrees). Moreover, background noise can be introduced simultaneously and be in or out of phase with itself or with the speech signal. Licklider[5] gave specific names to these arrangements. Those which concern us at the moment are the cases in which the signal (speech) and noise were both "in phase" or both "out of phase"; these conditions he termed homophasic. When the conditions were opposite for the speech and noise, that is, speech "in phase" and noise "out of phase," or the reverse, he termed them antiphasic. Before relating his findings it is necessary to say something about intra-cranial localization and phase relations.

Characteristically, in quiet, when one ear is stimulated the sound is localized at that ear. When two ears are stimulated and "in phase," the sound is localized at the midline or center of the head. If the sounds are presented binaurally "out of phase" the sounds are located at both ears. If noise is presented "out of phase" it seems to cover a wide area across the head rather than at each ear as is found with speech or pure tones delivered "out of phase."

Licklider's[5] study illustrated how speech signals and background noise interact. He found that the highest intelligibility scores emerged when speech was "out of phase" and noise was "in phase" $(- +)$. This is another way of saying that masking was least. If this arrangement is analyzed it is found that speech delivered "out phase" is localized at the two ears, whereas the noise "in phase" is localized at the center of the head. Thus the two are separated intra-cranially and are apparently conducive to high intelligibility. The two antiphasic conditions produced the highest efficiency; the homophasic conditions produced the lowest. Interaural inhibition occurred markedly only when the interaural phase relations were speech "in phase" and noise "in phase." In this instance both signal and noise were localized near the midline, which resulted in a greater masking of the speech signal.

At least one other significant finding relative to monaural-binaural comparisons should be mentioned before closing. Keys[6] found that binaural summation was reduced whenever the differences in threshold levels of the two ears were in excess of 6 db. In order for binaural summation to occur and thus provide the small gain in hearing acuity the ears must be matched to within this range. Thus, intracranial localization and threshold differences between ears are basic considerations in the use of earphones and, particularly, monaural units of all types. The implication is that foreground (speech) and background (irrelevant noise) functioning

[6] Keys, J. W., *The Comparative Threshold Acuity of Monaural and Binaural Hearing for Pure Tone and Speech as Exhibited by "Normal" and Hard of Hearing Subjects.* Unpublished Dissertation, Northwestern Univ., 1946. Abstract in *J. Acoust. Soc. America,* 19, 629–31.

in audition, which is basic to *listening behavior*, is likely to be enhanced only when the speech and noise can be separated either intracranially or extracranially when using any type of amplification unit.

In conclusion, then, the intact auditory system has been reviewed briefly. Some basic questions regarding the neurophysiology of hearing have been raised with respect to various anatomical levels of hearing impairment. The concept of a dynamic, constantly shifting threshold of hearing has been discussed. Validity and reliability in auditory testing have been mentioned. Finally, some monaural-binaural comparisons were introduced.

It is hoped that this discussion has provided some background for the papers which follow and also result in further discussion and study on your part.

PSYCHOLOGICAL IMPLICATIONS OF INTEGRATION OF DEAF CHILDREN WITH HEARING CHILDREN*

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It has often been said that the field of the deaf is the most controversial profession in which to be. In 1909 Horn said, "One who dares to have opinions about the education of the deaf had better, if he wants to keep some of his professional friends, duck into the trenches on one side or the other." At the time Horn made that statement we had the residential-day school feud. The residential schools said the day schools taught nothing but speech elements and numbers, and that the students transferring from day schools were very retarded academically. The day schools in return said that the residential schools taught nothing but signs and that their students were very retarded academically. The trouble was no one bothered to look far enough into the problem to realize that each school was getting the other's failures. Parents do not transfer children who are getting along all right. The old residential-day school feud is now over. Teachers trained in one type of program are teaching in the other and transfer of a child from one school to another is accepted when it is indicated that for the good of the child such transfer is advisable.

We now have the question of integration versus segregation. In our public school program in Ohio we have both types of programs. I cannot honestly say one system is better than the other for all children. Some children profit more by being in one type than in the other. At present we need all degrees of integration—from all to none.

Last summer one of the topics which was most thoroughly discussed in the Day School section at the national convention in Knoxville was curriculum for deaf children. Those of you who were present will recall it was agreed that the majority of deaf children cannot be expected to do the work of hearing children on the high school level without considerable help. Whether this help should be to the extent that the homeroom teacher of the deaf shall teach subject matter or assist by tutoring was the question. A committee under Genevieve Drennen is studying the issue now.

Before we talk about the psychological implications of integration, we had better agree on the terms of reference we shall use. Which psychology shall we follow? We can be Freudian and say it's 'sex' which makes some children oral failures. We can give a child some dolls and if he removes the clothes from the male figure first, we can

* A paper read at the Mu Iota Sigma Sorority 1957 Convention, Chicago, Illinois.

say, "Ah!" But if he removes from the female figure clothes and starts tugging at the breasts, which are rather prominent on the dolls used for this type of study, we can say a much bigger "AH". If he tears them off we have a very interesting case to include in the next book we write. We can even go so far as to embrace the umbilica theory that the severence of the umbilica cord can be too abrupt. This, according to theory, can have a more lasting effect than the birth trauma!!!

My term of reference today will be an adaptation of the social learning theory of psychology. Rotter expresses it in a formula B.P. = E & RV which simply means that the potential for behavior to occur in a situation is a function of expectancy and the value of reinforcement. The potential for behavior of a Milwaukeen in the last inning of the last game of the world series was a function of the expectancy of elation following victory and the value of elation. The potentials for behavior of the same persons here today are vastly different. Those of you who expect to be bored are indicating that in your behavior, unless you fear you'll be hurting my feelings. I expect none of you to behave as you would have during the world series. Indeed, my behavior would alter considerably if one of you jumped up and yelled, "Atta girl, Worthington, give it to 'em." I like the social learning theory, so with your permission we will look at integration with a social learning point of view.

Now for the term integration. Integration, as a psychologist sees it, is a systematically arranged or organized process. Thus, if integration of a deaf child's program into a program with hearing children is systematically organized, by definition, it will work. But when children with hearing losses are placed in classes with hearing children without being prepared for such situations, in other words, by an unorganized process, the result is disasterous. Integration depends upon the child's social maturity and academic achievement. We can not expect a deaf child to participate successfully in a class with hearing children until he is ready for such an experience.

Last year our speaker advocated complete integration, going so far as to say special classes should be abolished. We, who work with the deaf, know that at present such a program could not work. Teaching the deaf is a highly technical skill and requires a well trained teacher.

Although complete integration can not work under present conditions, partial integration can and does work. Where it happens, we have two factors present—adequate social maturity and academic achievement of the children. The responsibility for these rests to a large degree with the teacher of the deaf.

With the very young deaf child we are concerned with social development. In these years, group activity is non-existent. Sociability is a learned behavior. A child of 2 or 3 is egocentric—very content to play by himself. The function of any nursery school is to provide an atmosphere in which a number of children can play simultaneously and to provide supervision and materials for the child's development. At this level, integration could be at a

maximum. Ideally, the nursery age deaf child could be in a nursery school for hearing children if a person trained in working with this age deaf child were in the same room with auditory equipment and 'know how' to take advantage of situations in which training could effectively be started.

As I have said, sociability is a learned behavior. If a child has pleasant experiences with other children he will expect to have pleasant experiences in the future and his behavior potential will be in accordance. The same principle can work negatively. Let me illustrate with Dougie, who was in a multigraded class I once taught. He was a bright little four year old but definitely anti-social. The cab would pull up to the school in the morning and the cab driver would honk his horn. Dougie had to be literally dragged into school. The cab driver felt it was my job to do this, and I suppose it was. The boy was a sturdy little chap with scratches and tooth marks all over him. A home visit helped me realize why Dougie was so belligerent. He lived in a housing project. Both his parents worked all day, leaving him in the care of a neighbor. In an attempt to show their baby the love they had for him, they bought many expensive toys. The child may have developed 'normally' if he had remained inside and played with the toys. He would not have had the healthy tan he had but his behavior would have been more acceptable. Placing the boy out-of-doors with his toys would have been ideal had it not been for the fact that there were many children in the neighborhood who had no toys. Poor little Dougie—all he wanted to do was to play with his toys, but he had to fight to retain his possessions. Very young children do not understand the meaning of sharing. It is for this reason that when parents bring their children to visit families in which there are young children, they should bring their own child's toys so that he does not want to take something from his little host, something that the host suddenly decides he wants for himself.

Dougie's behavior was not a result of his deafness. Any child in a similar situation would have acquired the same behavioral pattern. Dougie had had so much negative reinforcement that his behavior potential was a belligerent one. You see it was a function of expectancy to have his toys taken away from him by other children and reinforcement of keeping the toys if he fought. Dougie was not ready for complete integration into a regular kindergarten.

A program was planned for Dougie which included a great deal of association with hearing children in the regular kindergarten. The kindergarten teacher understood Dougie's problem and prepared the other children for his arrival. Dougie brought crayons to school but he would not put them in his desk; he carried them with him all day, in the hearing room, the kindergarten, to the bathroom and on the playground. At the end of the day he took them home. He was so sure someone would take them from him. While he was in the hearing room, we helped him develop security and communication readiness—doing a lot of matching, for really, lipreading is merely another type of matching—matching of what is seen on a person's lips to some concept in one's mind. Slowly Dougie's

behavior pattern changed, he began to like school, he brought toys for others to see. He was on the road to an integrated program in elementary school.

Gesell says with our preschool deaf child, we should communicate in the best manner we can. We can justify this with the social learning theory. A deaf child tries to tell us something. We say 'talk' but he does not have a vocabulary with which to tell us what he wants to communicate. We say "Don't use your hands." This is negative reinforcement. His expectancy then soon becomes a "No," "don't do what you are doing, do something else—something you don't know how to do", and rather than meet with this situation he avoids communication in the future. If Tim comes to you and points to Johnny and indicates *push*, you have a wonderful chance to introduce him to the word *push* by saying "Johnny pushed you? Oh, my." The hearing child must hear a word many times before he can be expected to use it, so we must take advantage of little experiences to expose the deaf child to the spoken word. This experience could happen in a nursery for hearing children if the teacher understands the problem of the little deaf child.

So, we can integrate to a very large degree in a nursery program. In fact it would be much better for a deaf child of nursery age to be in a nursery school for hearing children, than to be in a multigraded deaf class where he would have to sit still for long periods of time. At this age we are only concerned with communication readiness and social maturity. We are instilling in the child the desire to learn more about this wonderful world of ours—we should not be pouring in facts, names of objects.

In Columbus we have a situation which is working out nicely for preschool deaf children. It might be considered by some a segregated situation because the deaf children are not with hearing children during the school hours, but it is under Faith Ekstom and it is her foremost goal to help her little ones get ready to compete with hearing children. A trained and experienced nursery school teacher helps her with both the 3 year old group in the morning and the 4 year old group in the afternoon. Parents spend a great deal of time with Faith, as do hearing children who love playing with her little ones. The three year old is just beginning to become interested in other people, he likes to play by himself but he can play well with one or two other children. The four year old is extremely active and very social. He likes to join in group activities with three or four others, not always cooperatively, sometimes quite aggressive and bossy. Faith understands these principles and following them, she is able to give a lot of speechreading, speech, and auditory training. These children will be ready to get along fine in a regular kindergarten for that portion of the day; they will not be getting help from the 'deaf' teacher. Faith's nursery school helps the child in making the transition from the limited society of his home and family to the school in which he will be further helped in the transition to adult society.

At the preschool level we are concerned with helping our deaf children get along with his peers. When our children reach the

academic school level we are confronted with our second problem, preparing him for academic success in the hearing class. To be placed in a group of 30 may be traumatic for him. He may feel that he is rejected, ignored and left unprotected. For this reason the choice of the teacher who will have him in her class is of utmost importance. It is her responsibility to help the child attain a feeling of security or an expectancy for success in the process of growing up. She can only do this if the teacher of the deaf has prepared the child to be successful. A teacher of the deaf should never expose a deaf child to a class for the hearing unless she is certain that he can attain success. Teachers follow the same behavior laws as do children. If you give a teacher a handicapped child who is likely to succeed, the teacher in return will accept that child and do her utmost to help him continue to be successful.

This all gets down to the fact that we as teachers of the deaf must do our utmost to develop intelligible speech and lipreading ability and then to judge whether or not the child's communication skills are adequate for his participation with hearing children. Provide ample opportunities for your children to communicate with others, and seek other's advice as to whether or not the child is ready. Some of you may have read the article written by a mother saying if she had a child with a broken leg she would not send her child to a school for children with broken legs, so she would not send her deaf child to a school for deaf children. To this I would reply, "I, too, would not send a child with a broken leg to a broken leg school, but I would not let that child of mine go out for football until the doctor said he was ready." I would not send a child who was not ready for it, to be integrated into a class for hearing children for then we would not have true integration.

We must teach our children to say "I do not know what you said." Too often I will go into a classroom and talk to a group of deaf children, their faces indicating that they are understanding everything I say, only to find out with a few questions that they understood nothing. Try saying, "What's a dame?" to a deaf child. Too often you'll get back, "My name is . . .." Unless we train our deaf children to indicate when they are understanding what is said, we will have teachers in the regular hearing classes saying, "The deaf children in my class understand everything I say but they just can't follow directions. They don't seem to retain anything I say."

During the early academic years, the deaf child needs a great deal of help in communication skills. As he acquires these skills he can spend a greater percent of his time in classes for hearing children. When he reaches high school age he still needs help but may be able to take regular work with hearing children. I said "may". Many deaf children cannot. We are becoming more and more aware of the fact that we have non-oral children. England too is concerned over this problem and last year sent representatives over here to see what we do with what they call "oral failures". To have a child sit in a class in which he cannot follow what is going on is ridiculous. It would be as senseless as having me attend Russian lectures on Sputnik, or Chinese lectures on rice.

Recent studies have indicated that the deaf child cannot be successfully integrated into a hearing program. These studies have received undo publicity. Statistically, these studies can be criticized for the conclusions that have been drawn. They apply only to the subjects used in the experiments. We can not generalize from the limited population used.

We who have tried it know integration can work for some. We a'so recognize the fact that in all cases it does not work. Yesterday morning I was in a small town at the request of the local superintendent. Three years ago a deaf girl had been sent back from one of our centers with a report saying she was ready to do work in the regular sixth grade. She was placed in fifth grade after it was found that she could not function on the sixth grade level. Five hours of tutoring a week was provided for her. She was given passing grades because she 'tried', even though her work was failing. The day before yesterday, her class was asked to write, "What the 8th grade means to me". Her essay was a pathetic explanation of how hard she works, ending with, "I need more help." A conference was held with the teachers, tutor, principal, and superintendent. It was agreed that the girl was a hard worker who received a great deal of help from her parents but she could not compete in a regular class. In the center for the deaf she had been a show pupil; here she was a failure. She was not ready for complete integration. She is going back to a system where she can have partial integration.

This was not an unusual case. There are many deaf children who are not finishing high school because the sledding is too tough. We are not the only country concerned with this problem. As I have said, England is concerned. My father is now translating a report of a convention held this summer in Germany. Quite a bit of it deals with professional and vocational education of the deaf. Unless we prepare our deaf children adequately, they will not be able to integrate into society after leaving school.

In summation, it is my belief that at present all deaf children cannot be integrated satisfactorily into a regular school program for hearing children. For those who will be able to make the adjustment, two factors must be present—social maturity with the communication skills which are inherent in it and an adequate academic achievement level. Integration is the summation of well made plans and perfect timing. The satisfaction we as educators get from seeing our former pupils competing successfully in a hearing world is well worth the hard work it takes in achieving this result.

AN EXPLORATORY INVESTIGATION OF A METHOD OF IMPROVING SPEECHREADING

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Determination of the factors which influence a person's ability to speechread has been of interest to educators of the deaf and hard of hearing for some time. Several writers have constructed tests to study speechreading. Among these are tests by Heider and Heider (6), Conklin (4), Morris (10), Reid (12), Utley (13), Cavender (3), Costello (5), and most recently, Lowell (8). Despite this interest, little has been discovered which clarifies the dynamics or vital parts of this process. Lowell's work (9) suggests the presence of a high vowel-consonant ratio in material which is speech read easily. His work also suggested that the shorter the sentence the more difficult speechreading tended to become. Recently Costello (5) has studied speechreading from the standpoint of a developing language process in thirty-four hard of hearing and thirty-six deaf students. She concluded that memory ability as measured by a digit series was an important factor in speechreading. In addition, her results indicated that achievement in speechreading was positively associated with reading ability. A final significant result common to both her groups was the significant correlation obtained between speechreading and the results of the Wechsler Picture Arrangement Test. It was her impression that superiority in speechreading was definitely related to inner language ability.

Prior to Costello's work Utley (13) and Reid (12) had concluded that speechreading ability could not be predicted from the individual's chronological age, age at onset of deafness, grade placement, reading level, school achievement, training in speechreading, intellectual ability or grade status. The experimental evidence available to teachers of speechreading is thus mainly contributory in the sense of what does not affect speechreading.

Traditionally, the teaching of speechreading has had various approaches. The Müller-Walle Method (1) brought to this country in 1902 by Martha Bruhn has the characteristic of rapid, rhythmic syllable drills. The Jena method (2) described and developed in the United States by Anna Bunger in 1927 aims to develop kinesthetic awareness of speech; to teach the pupil to imitate visible speech and to recognize that speech rhythms are aids to understanding. This procedure is accomplished through analytical syllable drills.

The Nitchie method (11) on the other hand gave attention to the psychological phases of speechreading, i.e., mind training and eye training. The method advocates the training of the mind to grasp thought as a whole. The Kinzie Method (7) has combined the careful presentation of sounds from the Müller-Walle method with the psychological approach of the Nitchie. Little has been done by way of experimentally evaluating the success in speechreading which any of these methods provide.

A pilot study completed in 1957 by one of the authors seemed to suggest another method of stimulating speechreading ability. It was noted that ability to speech read showed a positive increase when a subject had been exposed to the delayed feedback phenomenon. In this early work, a group of mothers of children enrolled in the Preschool for the Deaf at the University of Kansas Medical Center read for five minutes a day, five days in a row under delayed feedback. At the end of the time this group demonstrated a consistent and positive improvement in speechreading ability. The present study was designed as a replication and elaboration of the earlier work. Specifically, the writers sought to clarify and demonstrate the conditions under which delayed feedback would improve an individual's ability to speechread.

Subjects

Three groups of adults were used in the experiment. These groups are hereafter labeled Groups A, B, and C. Twenty subjects were in each of the three groups. All were of normal hearing and had, at least, a high school education. The age range in the groups was from 20 to 65 years. The majority of each of the three groups fell in the age range between 20 and 30 years. The subjects were, for the most part, affiliated with the University of Kansas School of Medicine, either as practical or registered nurses, occupational therapists, physical therapists, secretaries, or physicians. Included in each group were two Negroes and two persons of foreign extraction (Mexican and Japanese). There were four males and sixteen females in each group.

Procedure

Each of the three groups received a pretest of their speechreading ability before beginning the experiment. Half of each group was administered Form A of the Utley Test first, and half of each group received Form B of the Utley Test first. At the conclusion of the experiment the alternate form was given to each group. Thus, those groups receiving Utley Form A first, received Utley Form B last. The same procedure was followed using Costello's single word test. In this case, words were split into two groups. The first 25 words listed by Costello became Costello Form A and the last 25 words became Costello Form B. All speechreading tests were administered without voice in a room artificially illuminated by three 60 watt light bulbs. There was a distance of six feet between the subject and the experimenter when the speechreading tests were administered. A constant noise level of 78 db, as registered on the

C Scale of the General Radio Sound Level Meter, (Type 1551-A) was the only other auditory stimuli present. This noise came from a room air conditioner which was on during the experiment.

Following the initial test Group B and C read from a current *Reader's Digest* five minutes a day for five consecutive days. A count of the verbal output was made for each day of reading. At the conclusion of the fifth reading they were again given the speechreading tests as noted above.

Group A completed the above conditions under influence of no amplification, and without daily reading from the *Reader's Digest.* Group B completed the above conditions under straight amplification. Group C received exactly the same amplification level in terms of the record level and playback level setting on the tape recorder as did Group B with the added variation that their amplification was received under conditions of delayed feedback. A Magnecord Pt 53 unit was used throughout the experiment with a tape speed of 7.50 inches per second. The delay time used for the delayed feedback condition was .19 second. Since the recording and playback level of the Magnecord Tape Recorder was undefined, it was decided to utilize readings obtained from measuring the pre-set recording and playback levels produced by use of a 1000 cycle tone as a reference point for future investigations. The recording level was set so that a pure tone of 1000 CPS having an SPL of 103.5db re .0002 dynes/cm^2 would be recorded at 88.6 db re .0002 dynes/cm^2. The playback intensity level was set so that this tone would be at a level of 94.1 db re .0002 dynes/cm^2. The individual dynamic range of speech reaction to the delayed feedback varied around these defined limits. PDR-1 earphones with pear-shaped cushions were used in this experiment.

TABLE I

Means and Standard Deviation for Speechreading Scores of the Three Experimental Conditions for before and after the introduction of the experimental variables.

Before	Before	After	After
Group A			
Utley Control	Costello Control	Utley Control	Costello Control
$\bar{x}$ = 20.10	12.5	17.7	12.2
s = 26.67	10.79	16.33	6.27
Group B			
Utley Amplification	Costello Amplification	Utley Amplification	Costello Amplification
$\bar{x}$ = 16.65	11.5	15.2	11.45
s = 12.66	14.89	18.17	5.84
Group C			
Utley Delayed Feedback	Costello Delayed Feedback	Utley Delayed Feedback	Costello Delayed Feedback
$\bar{x}$ = 14.8	12.4	20.45	14.65
s = 25.12	11.73	20.26	8.34

Table I presents the means and standard deviations for the three groups included in the experiment. The greatest change in the mean scores is for subjects having been exposed to a condition of delayed feedback. The significance of the changes was evaluated by the direct-difference method. Table II gives the t scores obtained in this analysis.

TABLE II

Results of t-tests evaluating differences in the pre- and post-test means for the three experimental groups.

Group	Experimental Condition	t-score	Level of Significance
A	No Amplification	Utley—2.73 Costello—.88	Sig. 01 level Not. sig.
B	Straight Amplification	Utley—.99 Costello—.0004	Not. sig. Not sig.
C	Delayed Feedback	Utley—7.07 Costello—2.76	Sig. 01 level Sig. 01 level

Both the Utley and Costello tests under the experimental condition utilizing delayed feedback show significant increases. The change is more than would be expected by chance one in a hundred times. This change in speechreading ability does not appear under conditions of straight amplification. When no amplification is used it is interesting to note that this particular group was worse on the Utley Lip Reading test at the end of the five day period than when they began. It is possible that this result may be the result of spurious factors. There is no change in the Costello test under this condition. The failure to equate the three groups initially makes inter-comparisons difficult.

Verbal output at the beginning and end of the experiment, as expressed by number of words spoken was correlated with the results of the speechreading tests. If the act of increased verbal output was a factor in increasing the ability to speechread, it was felt that a positive correlation would demonstrate itself. The results of the rank order correlations as presented in Table III generally fail to show any such relationship.

Correlations were computed only for the delayed feedback and straight amplification conditions. A significant negative correlation occurs when the amount of verbal output the first day is correlated with the speechreading skills demonstrated the last day by the Costello Test under delayed feedback. The only other correlation of statistical importance occurred when, under the condition of straight amplification, the number of words read on the last day appeared negatively related to the last Costello speechreading test. The overall failure to demonstrate consistent correlations in the other conditions suggests the variable of number of words spoken has little importance in the explanation of increased speechreading skills.

An explanation of the increased abilities in speechreading resulting under the delayed feedback approach is not immediately obvious.

TABLE III

Rank order correlations between number of words spoken and the various experimental conditions.

Type of Experimental Condition Delayed Feedback Amplification	Type of Experimental Condition Straight Amplification
First verbal output vs last Utley Score rho = −.11	First verbal output vs last Utley Score rho = .25
**First verbal output vs last Costello Score rho = −.61	First verbal output vs last Costello Score rho = −.06
First verbal output vs first Utley Score rho = −.35	First verbal output vs first Utley Score rho = −.10
First verbal output vs first Costello Score rho = −.07	First verbal output vs first Costello Score rho = −.08
Last verbal output vs last Utley Score rho = −.04	Last verbal output vs last Utley Score rho = −.03
Last verbal output vs last Costello Score rho = −.08	*Last verbal output vs last Costello Score rho = −.42

** Significant at 1% level

* Significant at the 5% level

Clinical observation of the subjects as they experienced this phenomenon would suggest an increased dependence on tactile and kinesthetic monitoring as opposed to auditory monitoring. The auditory disturbance accompanying the delayed feedback makes most individuals change their verbal behavior. In the case of normal hearing individuals, this might mean a retreat to an intact sensory avenue, which conceivably could be tactile sensation.

One other explanation has been advanced. Perhaps the subjects under delayed feedback were forced to attend closer to get meaning from the page. As a result the experimental condition tended to sharpen their attentiveness with the resulting improvement in speechreading ability when they were tested a second time.

Summary

Three normal hearing groups composed of twenty adults with at least a high school education participated in the study. The basic purpose of the research was to investigate the effects of various types of auditory stimulation on speechreading ability. Each group was administered the Utley and the Costello Speech Reading tests before and after receiving the various types of auditory stimulation.

Group A did not read but were tested twice with an interval of five days between tests. Group B read five minutes a day under amplification but with normal feedback. Group C read five minutes a day under conditions of delayed feedback. The group receiving delayed feedback showed a significant increase in speechreading ability. The group that received no amplification regressed

in their speechreading ability to a significant degree on the Utley test. No change was noted in the other experimental conditions. The results seem to indicate a possible new stimulus which affects speechreading ability. Further investigations are needed utilizing different time delays and varying sound pressure levels.

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Massachusetts Law To Educate Aphasics

NATHAN P. HARRIS, M.E.
Principal, Horace Mann School for the Deaf, Roxbury, Massachusetts

It is a fact that today the enrollments in some schools for the deaf include children with multiple handicaps—mentally retarded, cerebral palsied, emotionally disturbed and aphasic—to mention some.

The reason for these being admitted is usually a questionable hearing loss along with the other injuries. Schools for the deaf are prepared to work with normal deaf children, but are called upon to service those with above mentioned handicaps.

Not all schools for the deaf have the trained personnel that can with assurance recognize the aphasic, nor do they have the trained teacher to educate them.

The aphasic child is admitted to a school for the deaf and the classroom teacher soon has a difficult situation to cope with. She realizes that the aphasic child cannot work with a group; that he needs a tutorial program to suit his own needs; and that he looks to the teacher for constant help. Either he or the other children in the class are neglected in a very poor teaching and learning situation.

In Massachusetts for some time this problem was discussed by educators of the deaf and the director and supervisor of the department of special education. Now Massachusetts has taken a sorely needed forward step in providing classes for aphasic children with a hearing loss.

The first such class was opened in the Boston School for the Deaf in Randolph, Massachusetts in October, 1957, the way being set by the passing of a law by the legislature to provide instruction for aphasics. This particular section was included in the prevailing law providing education for the deaf and the blind. Following are excerpts from this law:

THE EDUCATION OF BLIND, DEAF AND APHASIC PUPILS.

"The department may, upon the request of the parents or guardians and with the approval of the governor, send such deaf, such blind and such aphasic persons as it considers proper subjects for education, for a term not exceeding twelve years to the Clarke School for the Deaf at Northampton, to the Horace Mann School at Boston, to the Beverly School for the Deaf at Beverly, to the Boston School for the Deaf at Randolph, to any other school for the deaf or school affording remedial treatment for the deaf in the Commonwealth, as the parents or guardians may prefer, or to the Perkins School for the Blind or any other school within or without the commonwealth which provides instruction to the blind; or to any school within or without the commonwealth which provides

instruction for aphasic persons; provided, that each of said schools shall offer in the ninth, tenth, eleventh and twelfth years an educational curriculum equivalent to that in the secondary schools of the commonwealth, as determined by the department. Upon like request and with like approval, the department may continue for a longer term the instruction of any of such persons who are meritorious pupils recommended by the principal or other chief administrator of the school which they attend. With the approval of the governor the department may, at the expense of the commonwealth, make such provision for the care and education of children who are both deaf and blind as it may deem expedient. No such pupil shall be withdrawn from such institutions or schools except with the consent of the authorities thereof or of the department; and the expenses of the instruction and support of such pupils therein, actually rendered or furnished, including their necessary traveling expenses, whether daily or otherwise, but not exceeding ordinary and reasonable compensation therefor, shall be paid by the commonwealth; but the parents or guardians of such children, who are able wholly or in part to provide for their support and care, to the extent of their ability may be required by the department to reimburse the commonwealth therefor."

Massachusetts may be the first state to make such specific provisions for aphasics within its public school system, but first or not it may lead the way to interest those states who do not have such a program.

Request For Exhibit Material

People to People Program

The Association of Friends of the Nippon Rowa Gakko (Japan School for the Deaf) located in Tokyo, Japan, requested the post's assistance in the procurement of about thirty to one hundred items (paintings and handicraft work) made by deaf students of any age or sex attending schools or institutions for the deaf in the United States.

Tentative plans call for exhibiting and sale of the material at an exhibit to be held in the fall of 1958 in one of Tokyo's leading department stores. The stated purpose of the sales is to promote funds for furthering "Education of the Deaf" activities in Japan.

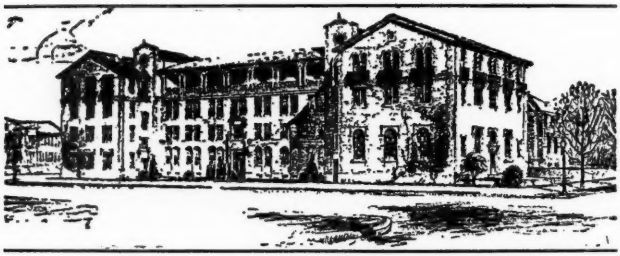
The title of the exhibit would be "International Exhibition of Pictures and Handwork of Deaf Students in Schools for the Deaf in All Nations throughout the World". The sponsors are approaching other foreign embassies in Tokyo with the purpose of procuring exhibit material. Besides other sources that may be available to the Agency, the post would like to suggest approaching the Dept. of Health, Education and Welfare for assistance regarding the above request.

Sponsors suggest that each item be identified in the following manner. Name, sex, age, school grade and name of school which student is attending.

Grant Made to St. Joseph's School for the Deaf

Genevieve M. Ryan, Supt. of the St. Joseph's School for the Deaf, 1000 Hutchinson River Parkway, New York, New York, has announced that the Surgeon General of the United States Public Health Service has, with the approval of the Mental Health National Advisory Council, granted St. Joseph's School for the Deaf an award of $30,000 per year for 3 years for "A Differential Study of Communication Disorders". The Study is being undertaken in cooperation with Columbia-Presbyterian Medical Center and the Department of Special Education of Teacher's College, Columbia University.

THE Language Outline prepared by the members of the faculty at Central Institute for the Deaf, St. Louis, Mo., has been reprinted for the fourth time since it was originally published in the AMERICAN ANNALS OF THE DEAF in September, 1950. Copies may be obtained for fifty cents. Orders may be sent to the AMERICAN ANNALS OF THE DEAF, Gallaudet College, Washington 2, D. C.



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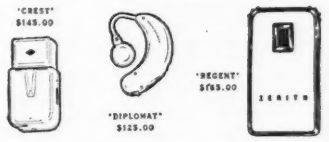

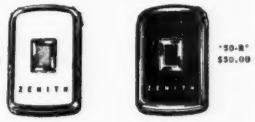

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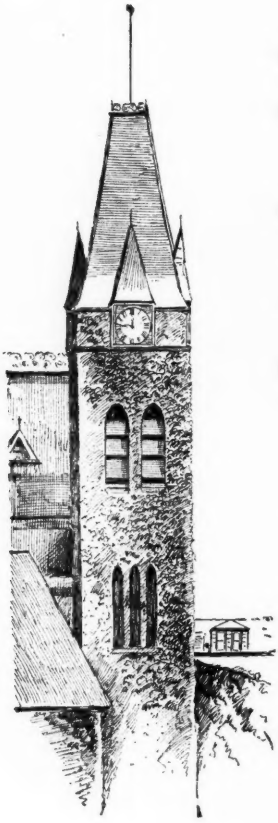

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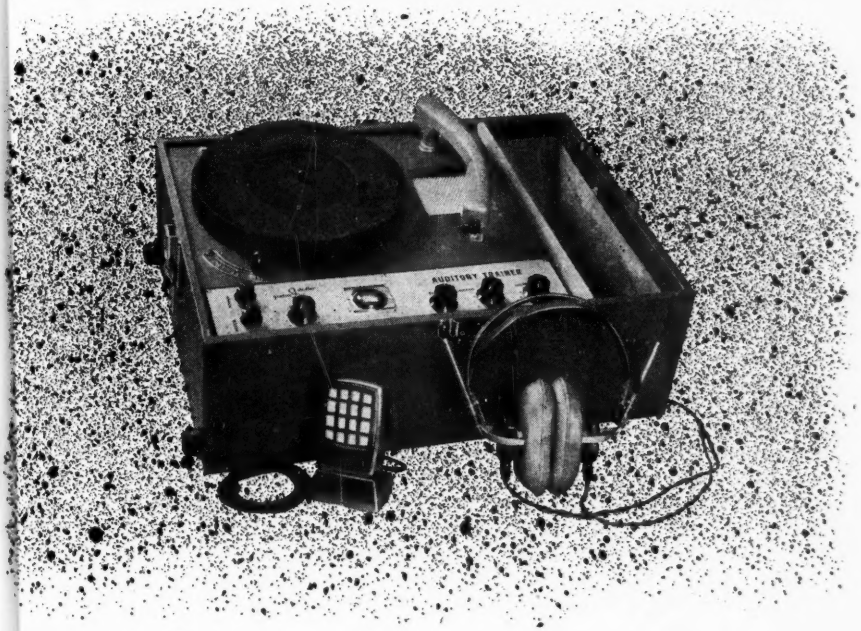

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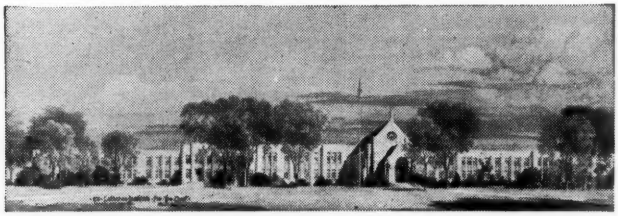

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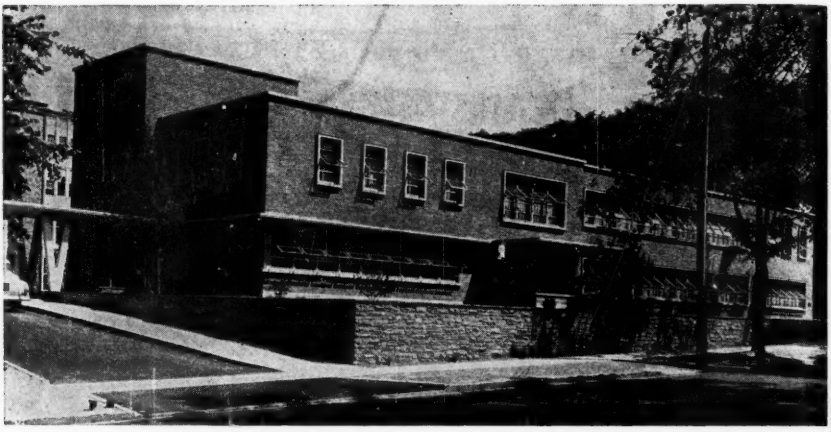

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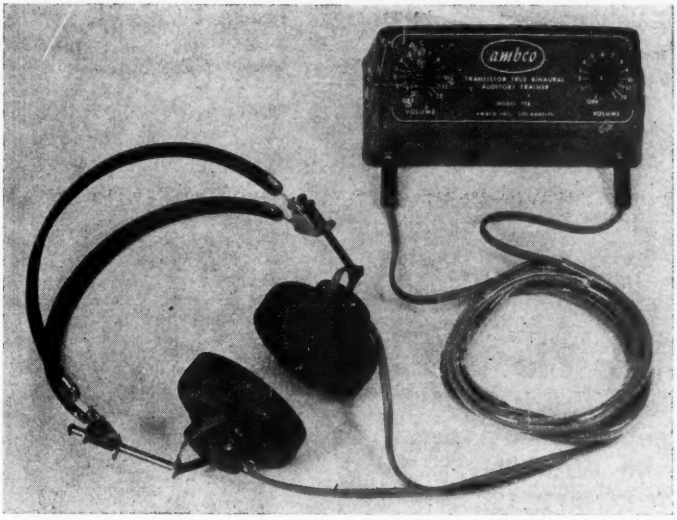

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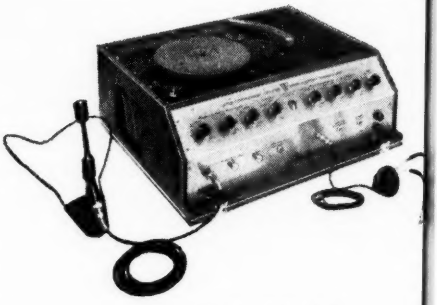

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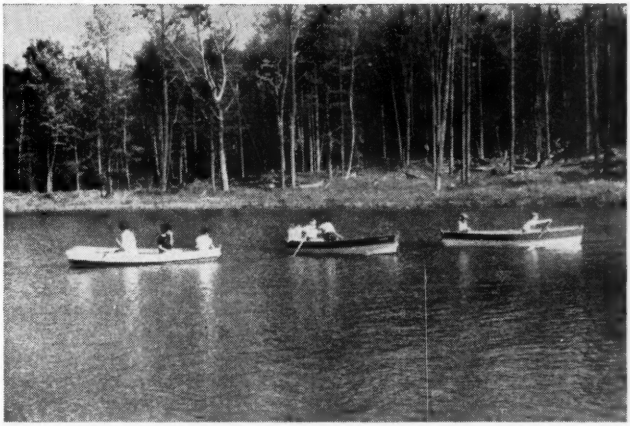

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For September '58 three oral teachers—our new school for the deaf is growing faster than anticipated. We need one nursery, one primary and one high school teacher. Salaries are good. Social Security and Teacher Retirement. Annual increments. Well equipped rooms. Progress and opportunity. Write to: W. L. Allen, Office of Deaf Education, 140 West Midwest Avenue, Casper, Wyoming.

Conference of Executives of American Schools for the Deaf

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